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Modification of Affective Trajectory in a Positive Psychology Intervention

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Abstract:

Enhancing positive affect (PA) and reducing negative affect (NA) are targets of positive psychology interventions, and well-being and positive functioning are core elements of mental health. However, the underlying temporal dynamics of these elements are unknown. This study aimed at identifying how a 42-day daily positive psychology intervention (PPI) impacts affective longitudinal dynamics compared to a control condition. This study employed an experience sampling method (self-observation diary including the Measurement of Affectivity: Valence/Activation scale, MAVA) with two non-randomised groups—a control group ($n = 43$) and an intervention group ($n = 43$)—taken from a community sample. Compared to the control participants, the PPI participants' trajectories for activated and deactivated NA showed an important decrease over the course of the PPI. The deactivated PA trajectory increased non-linearly across the PPI, whereas the activated PA trajectory showed a linear increase. This study suggests that PPIs change daily affective life.

Keywords: affect trajectory, experience sampling method, positive and negative affect, positive psychology intervention

INTRODUCTION

Positive affect (PA) has an important role in individuals' experience. It can spark the broadening of thought and action repertoires, contribute to the growth of individuals' strengths, and foster optimal functioning and flourishing (Fredrickson, 2004; Fredrickson & Branigan, 2005; Fredrickson & Losada, 2005). PA can also influence the trajectory of negative affect (NA) through an undoing process by reducing the perceived impact of negative events and supporting individual recovery (Congard, Dauvier, Antoine, & Gilles, 2011; Moneta, Vulpe, & Rogaten, 2012). Despite the fact that enhancement of PA is at the heart of the positive psychology movement, it seems that the temporal evolution of affective processes during a positive psychology intervention (PPI) has not yet been studied.

Positive psychology constitutes a preventive approach that aims at promoting health and positive growth. This approach values the

development of an individual's skills at facing any issue that arises rather than waiting for its occurrence to act upon it (Chodkiewicz & Boyle, 2017). The Positive Emotion, Engagement, Relationships, Meaning, and Accomplishment (PERMA) model (Seligman, 2011) identifies the elements that constitute well-being that have been identified empirically. The objective of this research is to construct blocks of exercises testing the five elements of the PERMA model and validate the positive intervention structured on these elements. A meta-analysis on PPIs showed their effectiveness in the enhancement of subjective well-being and psychological well-being, as well as in helping to reduce depressive symptoms (Bolier et al., 2013).

This field of research is interested in understanding the underlying mechanisms, conditions, and processes that lead to such outcomes (Fredrickson & Losada, 2005; Gable & Haidt, 2005; Rashid, 2015).

To achieve this goal, PPIs have been designed and evaluated (Botella et al., 2017). Some PPIs have been centred on single aspects, such as strengths, optimistic views of oneself, gratitude, or savouring positive events. These interventions showed increases in well-being (Bolier et al., 2013; Proyer et al., 2016b), decreases in depressive symptoms (Bolier et al., 2013; Proyer et al., 2016b; Seligman, Steen, Park, & Peterson, 2005), and increases in PA (Emmons & McCullough, 2003; Sheldon & Lyubomirsky, 2006). Other PPIs have several components (Moskowitz et al., 2012; Proyer et al., 2016a; Roepke et al., 2015), and findings have highlighted decreases in depression (Roepke et al., 2015) and NA (Moskowitz et al., 2012) and increases in life satisfaction (Roepke et al., 2015) and PA (Moskowitz et al., 2012; Proyer et al., 2016a).

Although one's affective life is an essential outcome of PPIs, it is possible to note some discrepancies in the impact of PPIs when targeting PA and NA. Indeed, some PPIs seemed to influence average PA and NA levels (Drozd et al., 2014; Moskowitz et al., 2012; Proyer et al., 2016a), whereas others have not resulted in improvements in these variables (Martinez-Martinez et al., 2010; Mitchell et al., 2009). Authors thus recommended that affect should be differentiated not only according to their valence (i.e. positive or NAs) but also according to their arousal levels (i.e. activated and deactivated affect; Martinez-Martinez et al., 2010; Mitchell et al., 2009; Pettersson, Boker,

Watson, Clark, & Tellegen, 2013; Russell & Carroll, 1999). This would overcome the bias related to considering activated emotions alone (such as excitement, enthusiasm, distress) and therefore increase the level of details perceived about participants' affective changes.

Previous studies have emphasised that multicomponent PPIs yield better benefits with regard to well-being and happiness than programmes focused on a single element (Parks, 2015; Parks et al., 2012; Sin & Lyubomirsky, 2009; Thompson et al., 2015). Accordingly, the current study's approach was deliberately constructed with a multicomponent 42-day PPI. This decision is also congruous with the self-concordance motivation approach (Sheldon & Elliot, 1999; Sheldon & Lyubomirsky, 2006) and the person-activity fit model (Lyubomirsky & Layous, 2013; Schueller & Parks, 2014), which posit that activities consistent with the participants' own aspirations will elicit better outcomes.

Therefore, the 42-day PPI was based on theoretical foundations, including both notions of eudaimonism and hedonism (Ryan & Deci, 2001). The PPI daily activities aimed to influence psychological well-being (Ryff & Keyes, 1995) through actions revolving around self-acceptance, personal growth, purpose in life, positive relationships, environmental mastery, and autonomy. Subjective well-being (Diener, 1994) was targeted through the development of activities meant to enhance life satisfaction and PA and to decrease NA. This PPI also addressed the enhancement of positive reappraisal skills. Overall, emphasis was placed on activities pursuing "pleasure", "engagement", and "meaning and purpose in life" (in accordance with the happiness component model, Seligman, 2002), in addition to "positive relationships" and "accomplishment" (in accordance with the PERMA model, Seligman, 2011). Emphasising PA through PPI activities seems especially important, as one study has noted that individuals whose PA levels increased after they completed positive psychology activities were more likely to benefit from the overall intervention than did those who did not see their PA levels increase (Proyer et al., 2016a). A recently published study on the efficacy of PPI pre- and post-intervention detailed its content (Antoine, Dauvier, Andreotti & Congard, 2018).

To our knowledge, no studies have targeted longitudinal dynamic changes in NA and PA according to their arousal level over the course of a multicomponent PPI compared to a control condition. Therefore, this study aimed to overcome the descriptive and static conventional approach of affective phenomena (e.g. Brown & Ryan, 2003; Prazak et al., 2012) and reveal the dynamic changes of affective trajectories over a 42-day period using an experience sampling method (ESM) and generalised additive models (GAMs). The ESM was used to monitor the impact of the intervention on affective dynamics with a great degree of ecological validity (Botella et al., 2017) and to prevent recall bias and memory distortion (Stone & Shiffman, 2002).

The positive psychology approach aims to assess that PPI with diversified activities in the different well-being registers leads to emotional changes and, in particular, increases PA. The first hypothesis explored whether the participants in the PPI would experience an increase in their PA trajectories at both the activated (APA; e.g. excited or cheerful) and deactivated (DPA; e.g., calm, serene, or quiet) levels compared to a control condition.

Congard et al. (2011) have shown that using PA in one's daily life limits negative affectivity associated with negative events. Researchers have assumed that engaging in a PPI increases the PA that counterbalances the negative effects of negative physiological affect (Ong & Allaire, 2005), and facilitates greater multiple repertoires of behavioural openness for better stress adjustment (Ryff & Singer, 1998; Staudinger, Marsiske, & Baltes, 1995). Increasing the PA encourages implementation of resources for dealing with a negative event (Tugade et al., 2004) to allow for faster recovery from stressful events (Fredrickson et al., 2003; Zautra et al., 2005). Thus, a dimension of the daily experience of NA is targeted during a PPI intervention. The second hypothesis tested whether individuals taking part in the PPI would experience a decrease in NA trajectories at both the activated (ANA; e.g. nervous, angry, or worried) and deactivated (DNA; e.g. annoyed, gloomy, or sad) levels compared to a control condition.

METHODS

Participants

Ninety-six 20- to 68-year-old adults ($M = 36.4$, $SD = 12.99$) were recruited from a community sample of the French population by Lille University psychology students. This intervention study consisted of a control group on a waiting list ($n = 41$) and an experimental group ($n = 55$). The announcements invited people to participate in a 48-day intervention study that evaluated the effect of a PPI versus a control condition. The inclusion criterion admitted participants over 18 years of age. Individuals reporting current mental health treatment or a current psychiatric diagnosis and deaf individuals were excluded from the study based on declarative information provided by the participants. No remuneration was provided to the volunteers. Social and demographic data for the control and intervention groups are summarised in Table 1. The inclusion criterion based on the percentage of the activity complement was set at 75 per cent because this percentage is a usual criterion in comparable articles (Page & Vella-Brodrick, 2013).

Procedure

The French ethical research group Comity Nord West III gave its approval for this intervention study. Two groups were formed: an intervention group ($n = 55$, 38

TABLE 1

Participants' characteristics

<i>Variables</i>	<i>Value</i>	<i>Control group (n = 41)</i>	<i>Intervention group (n = 55)</i>
Sex	Female (%)	28 (68.3)	38 (69.1)
Age	Mean (Range; <i>SD</i>)	35.9 (20–68; 13.7)	36.8 (21–67; 12.5)
Education level:	years of schooling after primary school		

Employment status	Employed (%)	27 (65.8)	49 (89.1)	
	Student (%)	13 (31.7)	4 (7.3)	
	Retired (%)	1 (2.4)	2 (3.6)	
	Marital status	Divorced (%)	4 (9.7)	1 (1.8)
		Married (%)	9 (21.9)	16 (29.1)
		Single (%)	26 (63.4)	34 (61.8)
		Civil union (%)	2 (4.9)	2 (3.6)
Widowed (%)		0	2 (3.6)	
<hr/>				
	Mean (Range; <i>SD</i>)	8.5 (6–2; 1.73)	9.5 (0–17; 3.1)	

females) and the control group (n = 41, 28 females) from a previous study using the same methodology. Participants were informed that their responses would be handled anonymously and that they could end participation at any time. Informed consent was obtained from all individual participants included in the study prior to participation. Initially, the participants were assigned to the PPI and waiting list control groups (either starting the intervention immediately or waiting 6 weeks before the intervention started). The two groups were appropriately balanced in terms of sex and age for comparison. First, participants were invited to complete a sociodemographic questionnaire. The participants who signed up for the study were mailed detailed instructions, namely, the investigators' contact details, questionnaires, and the 42-day PPI programme for the participants in the experimental group. Then, over a 48-day period, the participants completed a pen-and-paper self-assessment diary twice daily between noon and 2 pm and between 7 pm and 9 pm. A question about activity commitment was added to the ESM for the experimental group. The experience sampling method questionnaires were printed in a self-observation daily diary. This task did not require more than 2 minutes. Days 1–3 were meant to acclimatise the participants to the ESM rhythm, and they could set an alarm clock if it helped them to remember to complete the assessment. During the 6-week period from days 4 to 45, the intervention group participants took part in the PPI, while the control group completed the ESM alone.

Measures

Demographic Information. Demographic information was provided on a questionnaire that sought information on each participant's age, sex, family situation, education level, and previous mindfulness practice experience.

Adherence. As part of the ESM, the daily self-observation diary was also meant to evaluate the participants' practice adherence. An adherence score was computed based on the information provided in the diary.

Affect. Affect was assessed using the 16-item Measurement of Affectivity: Valence/Activation scale (MAVA; Congard et al., 2011). This scale is based on a circumplex approach (De Raad & Kokkonen, 2000). Each item states an adjective describing an affective state belonging to either NA or PA divided according to the activation level. Participants answer using a 5-point scale ranging from 1 ("not felt at all") to 5 ("strongly felt"). The participants were instructed to read each word carefully and to indicate the degree to which they had experienced the different feelings and emotions since the last assessment. Activated NA (ANA) identifiers included nervous, angry, irritated, and worried. Deactivated NA (DNA) included annoyed, bored, gloomy, and sad. Activated PA (APA) included surprised, cheerful, excited, and delighted. Deactivated PA (DPA) included serene, calm, quiet, and still. The responses to each category of affect were summed to obtain a total score. The alpha values were acceptable (ANA = 0.72; DNA = 0.73; APA = 0.71; DPA = 0.74).

PPI Overview

This PPI was based on a review of the literature for PPIs and was adapted to the French population. The participants were mailed a printed diary encompassing daily activities organised around six main axes: the pleasures of life (i.e. at the hedonic level, recognition of, savouring of, and gratitude toward

individuals who contributed to pleasant moments; Bryant, Smart, & King, 2005; Emmons & McCullough, 2003; Seligman et al., 2005; Sheldon & Lyubomirsky, 2006), self-discovery (i.e. strengths and qualities implemented in daily life and kindness; Moskowitz et al., 2012; Otake, Shimai, Tanakamatsumi, Otsui & Fredrickson, 2006), positive relationships with others (i.e. nurturing quality relationships, efficient listening, and identifying and correcting maladaptive communication patterns; Gable, Gonzaga, & Strachman, 2006; Gable, Reis, Impett, & Asher, 2004), negative events/positive reappraisal and mindfulness (i.e. formal and informal practices; Seligman et al., 2006), personal development, and meaning and purpose in life (i.e. mastery and autonomy; Ben-Shahar, 2009). Mindfulness was included in the PPI despite those two fields' fundamental postures discrepancies and because of their similar contribution to individuals' global well-being (Shankland & Andre, 2014). The aim was to train participants to adopt a broad perspective towards their present experience as a whole—which was thought to sustain positive psychology ingredients such as savouring, gratitude, or attendance to one's personal strengths (Garland et al., 2010; Hamilton et al., 2006; Ivtzan et al., 2016). The activities were meant to take no more than 20 minutes per day.

Data Analysis and Model Specification

Chi-square and independent-sample t-test analyses were conducted with JASP software version 0.8.1.1 for Windows to compare the groups at baseline.

GAMs were used to study longitudinal affective evolution and observe the effects of the PPI on the intervention group compared to the control condition. GAMs are an extension of generalised linear models and consider complex non-linear relationships between dependent and independent variables. GAMs are not only descriptive smoothing methods but also inferential analyses based on a model selection process (see Wood & Augustin (2002) for a review). GAMs rely on the model selection process, which includes a "wiggleness" penalisation term to avoid local overfitting (Wood & Augustin, 2002). Thus, the procedure allows the selection of the most appropriate model according to parsimony, the smoothness of the retained function, and the fit of the data. Therefore, GAMs provide sufficient flexibility to describe nonlinear changes in affective states in a temporal series (McKeown & Sneddon, 2014). Graphic forms were chosen to indicate the nature of the relationships. Standardised data were used to estimate nonlinear relationship directions in the GAMs and to obtain effect sizes. To better comprehend the temporal evolution of the affective variables, two groups of data models were constrained to begin at an identical level. These research models were computed with the "mgcv" library of R software (3.1.2. version). The power analysis was calculated with the R "pwr" package. Taking into account an average effect size equivalent to f^2 of .15, a 6-parameter model that allows two curves to be adjusted with an alpha of 5 per cent and a power greater than 80 per cent, a total of 100 observations is required.

RESULTS

Descriptive Statistics

Equivalency was found between the two groups at baseline except with regard to employment status; the control group included more students and fewer employed individuals than the intervention group [$\chi^2(2, N = 96) = 9.62, p < .01$]. Baseline levels of anxiety and depressive symptoms saw no significant

differences (Antoine et al., 2018) and could be used to measure the before-and- after effect of this protocol on these variables.

Adherence to the PPI

The adherence score in the intervention group averaged 78.98 per cent for the entire PPI. Data from the participants who stopped the ESM protocol were excluded from the dataset, whereas the missing data of the other participants were identified and kept in the dataset. In the experimental group, eight stopped assessing their affects in the first week, two stopped in the second week, four stopped in the third week, and one stopped in the fourth week. In the control group, 13 stopped assessing their affects in the first week, one stopped in the second week, two stopped in the third week, and one stopped in the fourth week. Chi-square analyses and independent-samples t-tests analyses were conducted according to the sociodemographic, anxiety, and depression variables between the two groups (stop and continue the protocol) and showed non-significant differences. A mean of 12.28 (SD = 7.1) ESM assessments (ranging from 0 to 25) were not completed for the experimental group (13.98% missing data), and a mean of 12.22 (SD = 7.8) ESM assessments (which ranged from 0 to 22) were not completed for the control group (12.78% missing data). Interviews with participants after the protocol showed that the daily life assessment added to professional and family life responsibilities was the principal factor contributing to these missing data. Participants exposed their difficulties in responding to intense professional situations but also in other spheres of life, especially the management of daily life and family.

Affective Trajectories

The GAMs of the influence of the PPIs on affective experience are displayed in Figure 1.

The correlations and alpha values are shown in Table 2. The alpha values were computed at each measurement time point and were averaged within individuals. Bravais and Pearson correlations highlighted significant relationships between all variables at the observation level.

The descriptive statistics and estimated GAM parameters are shown in Table 3. The estimated degree of freedom (edf) gives insight on the complexity of the nonlinear function, which is a composition of a linear trend. When the edf value equals 1, the relationship is linear. The higher the edf value, the more complex the linear characteristics are.

The ANA (deviance explained = 40.2%) and DNA (deviance explained = 45.2%) trajectories indicated that the participants in the intervention group reported significantly fewer NA than the control group participants across time (Figure 1, graphs a and b). In the intervention group, the ANA trajectory showed an initial 3-day decrease, followed by a decreasing pattern from days 7 to 23; an increase in the ANA appeared around day 30 and decreased over the last 12 days of the PPI. The DNA trajectory of the intervention group followed an overall decreasing trend, although the decrease was less marked and more stable between days 6 and 10 and between days 22 and 30. The control group participants' DNA and ANA trajectories did not display significant changes.

Regarding PA trajectories, the results showed a linear increase for APA (deviance explained = 18.7%; Figure 1, graph c), whereas DPA changes showed a

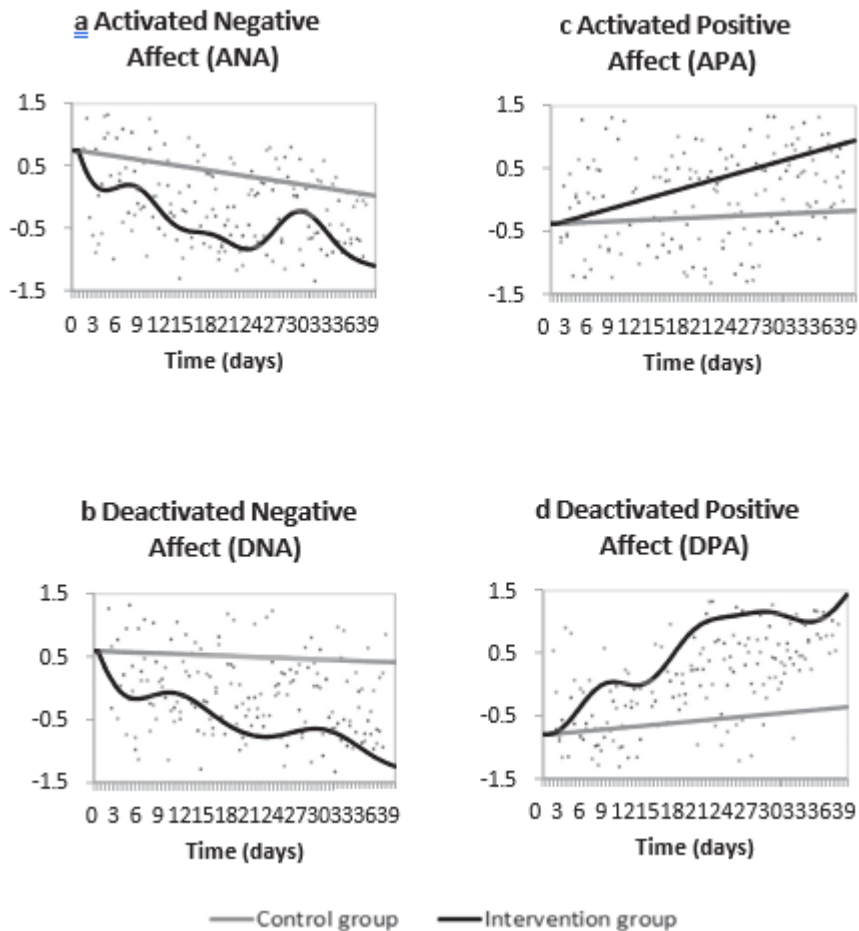


FIGURE 1. Affective trajectories during the course of the PPI. Notes: Each GAM graph shows the longitudinal trajectory of the variable over time (in days). Dots represent each measure per day and per participant to give more precision on variability and individual differences.

successive-stage pattern (deviance explained = 67.1%; Figure 1, graph d) compared to the control condition. The modelled figure showed an increase in DPA during the first week, followed by a stabilisation phase for 6 days before increasing again for the next 10 days. Then, the DPA remained stable for 12 days and finally increased over the last six days. The control group participants showed no significant change in APA and DPA.

TABLE 2
Correlations of the variables at baseline

Variables	1	2	3	4	Alphas
1. DNA	1	0.728***	-0.616***	-0.375**	.75
2. ANA		1	-0.597***	-0.263**	.73
3. DPA			1	0.624**	.74
4. APA				1	.72

Note: DNA: Deactivated Negative Affect; ANA: Activated Negative Affect; DPA Affect; Deactivated Positive Affect; APA: Activated Positive Affect; *** $p < .001$.

TABLE 3
Descriptive statistics and estimated GAM parameters

Variables	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>	<i>R-sq.(adj)</i>	<i>edf (CG)</i>	<i>edf (IG)</i>
1. DNA	0.7695	0.1206	14.71	<.001	0.42	7.70	8.58
2. ANA	0.7907	0.1304	13.44	<.001	0.37	6.48	7.63
3. DPA	1.933	0.1537	36.2	<.001	0.65	7.39	8.38
4. APA	1.331	0.1383	36.19	<.001	0.17	1	1

Note: DNA: Deactivated Negative Affect; ANA: Activated Negative Affect; DPA Affect; Deactivated Positive Affect; APA: Activated Positive Affect; *R-sq.(adj)* = adjusted *R*-squared; CG = control group, IG = intervention group; *edf* = estimated degree of freedom (when *edf* = 1, the relationship is linear; the higher the *edf* value is, the more complex the nonlinear aspects become).

DISCUSSION

The present study offered an opportunity to gain insight into the detailed trajectories of affective changes during a multicomponent 42-day PPI. Through ESM and GAM modelling, the phenomena of interest appeared when considering the temporal aspects of the affective trajectories over the PPI.

Considering the affective trajectories according to the arousal and valence levels, following the recommendations of Martınez-Martınez et al. (2010) and Mitchell et al. (2009), allowed observation of several differences.

The first hypothesis was also supported by the analyses. Indeed, both the APA and DPA trajectories increased during the PPI while remaining stable in the control condition. Again, some differences appeared, with a longitudinal increase for APA and an increase with a successive-stage pattern for DPA. Therefore, participants from the PPI seemed to have gradually experienced affect such as excitement, joy, and cheerfulness, and to a larger extent, by the middle of the PPI, they experienced greater levels of calm and serenity than participants in the control condition. Such observations are also consistent with the literature comparing pre- and post-intervention mean affect levels (Emmons & McCullough, 2003; Moskowitz et al., 2012; Proyer et al., 2016a; Sheldon & Lyubomirsky, 2006) and with the fact that undertaking unusual or everyday pleasant activities on a daily basis can improve subjective well-being (Linley et al., 2013).

Throughout the PPI, the ANA and DNA trajectories decreased non-longitudinally compared to the control condition. Interestingly, although participants seemed to have experienced a rapid decrease in both ANA (e.g. nervous, angry, or worried) and DNA (e.g. annoyed, gloomy, or sad) at the beginning of the PPI, the patterns of change differed, with more fluctuation over time in the ANA trajectories. However, the overall observations were consistent with authors having found decreases in average NA

after a PPI (Moskowitz et al., 2012) and with the first hypothesis, although it added more precision about NA-specific trajectories with regard to arousal across the 42-day PPI. This result can be interpreted by the daily implementation of satisfactory experiences leading to positive emotions of moderate intensity that gradually replace some of the negative emotions of the same intensity in the emotional space. A theoretical argument also proposed here is that by focusing on positive self-relating, identity formation and the acquisition of skills for growth and flourishing reduce NA.

Several factors may have influenced PA- and NA-specific trajectories during the PPI. Unlike Martinez-Martí et al. (2010), who focused solely on gratitude (counting blessings activity), the content of this PPI was more complex with several activities. Therefore, through activities that were based upon several models of positive psychology (e.g. subjective and psychological well-being), the participants may have found tools that were consistent with their aspirations or may have developed novel abilities (Lyubomirsky & Layous, 2013; Schueller & Parks, 2014; Sheldon & Elliot, 1999; Sheldon & Lyubomirsky, 2006). Over time, the participants learned new behaviours from positive experiences that might have developed into an attentional shift from a negative to a positive attentional bias (Wellenzohn et al., 2016; Xu et al., 2015). PA-eliciting activities and savouring pleasant events might have contributed to enhancing and maintaining PA levels (Pavani et al., 2016; Quidbach et al., 2010). Moreover, it may have contributed to an upward spiral toward increased PA (Fredrickson & Joiner, 2002) and to an undoing process relieving NA (Fredrickson, 2004; Fredrickson et al., 2000), although more analyses are needed to support this speculation. The use of PPIs may be considered a complementary strategy in mental health promotion and treatment (Bolier et al., 2013). This type of intervention could be used in a preventive approach or in addition to traditional psychotherapy. For example, for depressive states, a positive intervention would support the daily lives of patients discharged from the hospital or between consultations through structured exercises counterbalancing the depressive dynamics. To prevent the risk of depressive recurrence, particularly in patients with residual symptoms such as loss of interest or anhedonia, positive activities could compensate for the difficulty of diminished patient initiative and could consolidate support opportunities in their environment.

Several shortcomings and directions for future exploration need to be emphasised. The analyses were computed over a 42-day period. Adding a deferred post-test to assess whether the currently observed impacts on affectivity are maintained appears necessary. Moreover, extending the protocol's duration would allow for optimal temporality of this PPI. Because several activities were combined, we do not know the specific kinetics of each activity, which need to be explored with a larger sample. PPIs have started to show effectiveness in clinical areas (Bolier et al., 2013; Nikrahan et al., 2016; Roepke et al., 2015; Taylor et al., 2017); further investigation is needed to observe whether these outcomes can be generalised to a clinical sample. Moreover, considering intra-individual and differential patterns of evolution or involution based on the characteristics of the participants might help to elucidate the impact of the PPI on individuals (Molenaar & Campbell, 2009; Parks, 2014; Rozental et al., 2014; Sergeant & Mongrain, 2015). GAM analyses, which are appropriate to show nonlinear interaction effects and to model graphic representations, can be used to represent these individual changes. Future research may directly involve processing variable measures, such as positive reappraisal, detached reappraisal, and savouring, to assess their influences on subsequent affect evolution (Kuppens, Oravecz, & Tuerlinckx, 2010; Pavani et al., 2016; Wellenzohn et al., 2016). Indeed, many studies showed that savouring positive emotion competencies (Fredrickson et al., 2000; Garland et al., 2010) and developing reappraisal strategies in daily life (Le Vigouroux et al., 2017; Pavani et al., 2016) improve well-being. The goal in this protocol was to increase strategies that promote positive emotions and above all maintain them to create a balance to counter negative emotions. The idea is to construct emotion diversity that allows the same time and energy be spent on positive and negative emotions. The integration of one or more items from Bryant's Savoring Beliefs Inventory (SBI) (2013) and a CERQ

reappraisal item, for example in the ESM, could be informative of the processes on which these interventions operate and the development of the use of this type of process in every-day life.

In summary, this novel study offers interesting perspectives for considering temporal trajectories of changes in affect induced by a PPI using an ESM design and GAM analyses. Future studies may use these approaches to assess and generalise findings on specific interventions in the clinical field.

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